



# TEAM PISO

Gemstone Cohort of 2023



**GEMSTONE**  
Honors College  
University of Maryland

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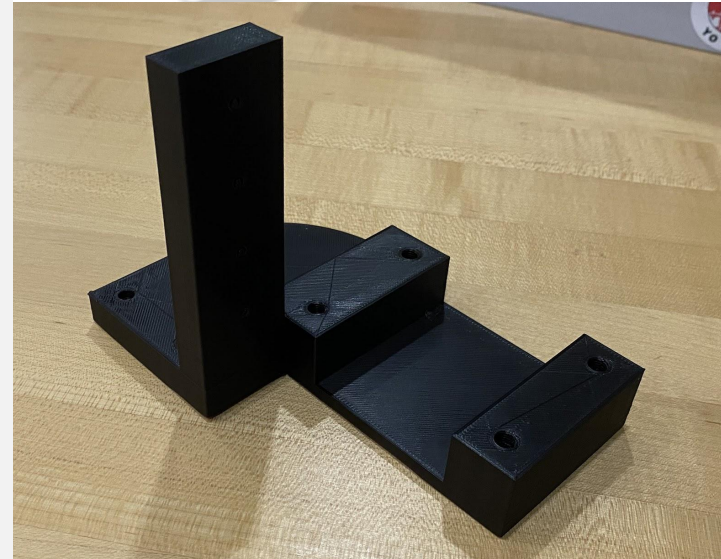
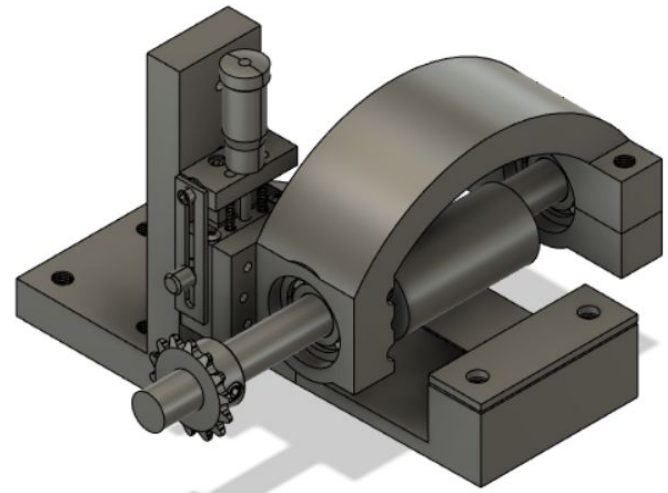
# OUR RESEARCH FOCUS

- **Alternative Energy** is the key to equity and sustainability
- Drawing power from *the action of taking a step*
- Piezoelectricity is an untapped renewable energy source



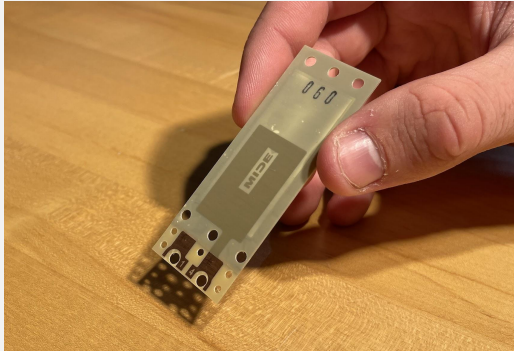
# METHODOLOGY

- Testing rig designed to simulate **rhythmic, uneven pressure**
- Modularity allows for variety of conditions
- Concurrently develop **models and simulations** to project power output



# RESEARCH STATUS

- Currently **assembling test bench** for characterization
- Issues with sourcing materials and deliveries have delayed testing



# DESIGN CONSIDERATIONS

- **Ideal end goal:** *implement tiles in public spaces*
- Take into account inclusivity and social impact
- ADA (American Disability Act) Accessibility Guidelines

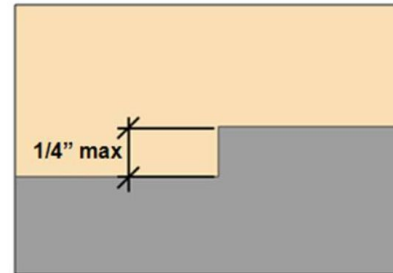
<https://www.access-board.gov/ada/guides/chapter-3-floor-and-ground-surfaces/>



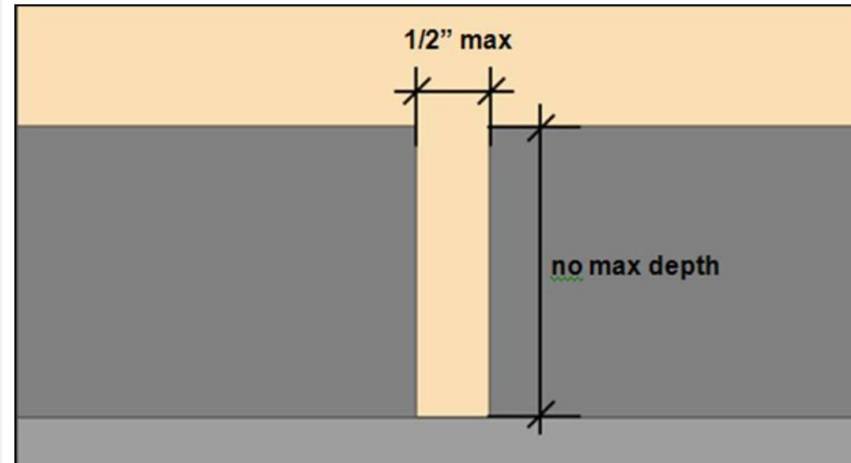
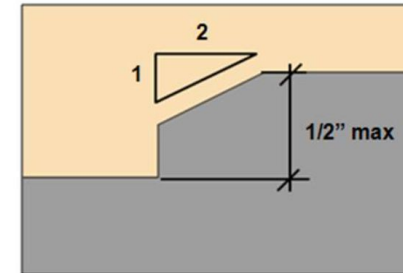
**U.S. Access Board**

*Advancing Full Access and Inclusion for All*

1/4" Max Change in Level



1/2" Max Change in Level



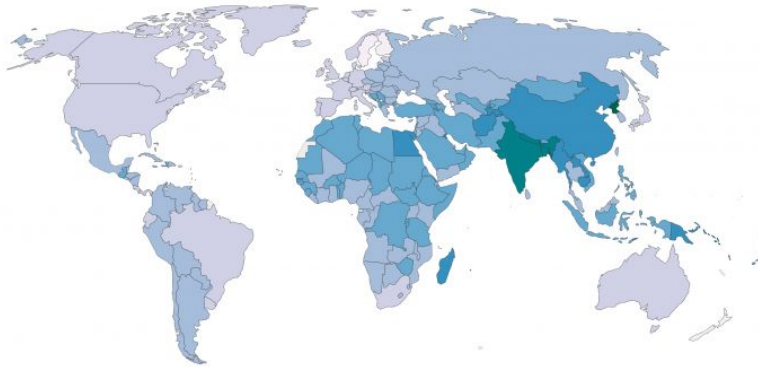
# CURRENT ENVIRONMENTAL CRISES

**Air Pollution** from burning fossil fuels:

Share of deaths from air pollution, 2017

Share of deaths which are attributed to total air pollution – outdoor and indoor – as a risk factor.

Our World  
in Data

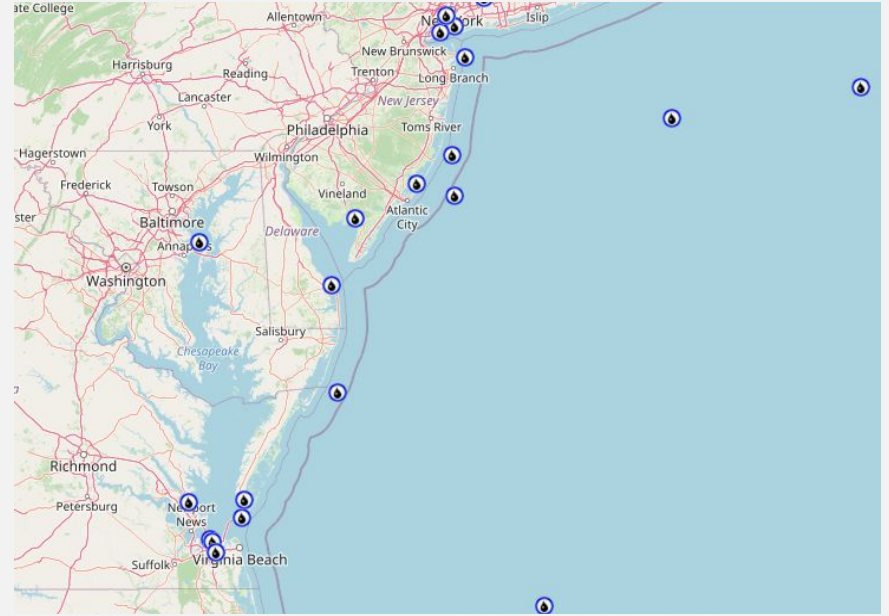


No data 0% 2.5% 5% 7.5% 10% 12.5% 15% 17.5%

Source: IHME, Global Burden of Disease

OurWorldInData.org/air-pollution • CC BY

Recently reported incidences of **Oil Spills**:



<https://response.restoration.noaa.gov/>

# DOING GOOD

## How much CO2 could be prevented from being emitted?

- NYC subway pedestrians can produce approx. 10,000 kWh of energy per day (5 barrels of oil per day)
- Approx. 76,000 fewer kg CO2 emitted per month



## How our research can directly impact and improve the global environment:

- Use **recycled materials** as flooring
- Generate additional **clean energy**
- **Raise awareness** for unorthodox alternative energy sources



# CONCLUSION & SUMMARY

## Research Focus:

Exploring *piezoelectricity* as a renewable, alternative energy source in floor tiles

## Research Status:

On schedule to conduct testing of piezoelectric components

## Methodology:

Utilizing the custom *test bench* to simulate and characterize varying behaviors and conditions

## Doing Good:

Both environmentally, through *energy efficiency*, and in design, through *inclusivity*



# ACKNOWLEDGMENTS

- Mentor: *Rick Blanton*
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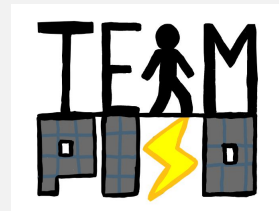
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